let-7 miRNAs Can Act through Notch to Regulate Human Gliogenesis.

Journal: Stem Cell Reports

Publication Year: 2014

Authors: M Patterson, X Gaeta, K Loo, M Edwards, S Smale, J Cinkornpumin, Y Xie, J Listgarten, S Azghadi, S M Douglass, M Pellegrini, W E Lowry

PubMed link: 25316189

Funding Grants: Molecular determinants of accurate differentiation from human pluripotent stem cells

Public Summary:
In this paper we showed that a family of small non-coding RNAs can regulate the developmental maturity of human pluripotent stem cell progeny in the neural lineage. As a result, we developed tools that allow for researchers to make certain types of brain cells much more quickly and easily.

Scientific Abstract:
It is clear that neural differentiation from human pluripotent stem cells generates cells that are developmentally immature. Here, we show that the let-7 plays a functional role in the developmental decision making of human neural progenitors, controlling whether these cells make neurons or glia. Through gain- and loss-of-function studies on both tissue and pluripotent derived cells, our data show that let-7 specifically regulates decision making in this context by regulation of a key chromatin-associated protein, HMGA2. Furthermore, we provide evidence that the let-7/HMGA2 circuit acts on HES5, a NOTCH effector and well-established node that regulates fate decisions in the nervous system. These data link the let-7 circuit to NOTCH signaling and suggest that this interaction serves to regulate human developmental progression.